

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Vacuum Cleaner Connector

5 We, DAYCO CORPORATION, of 333 West First Street, Dayton 2, Ohio, United States of America, a corporation organized under the laws of the State of Ohio, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to a vacuum cleaner connector, and more specifically to an assembly for interconnecting a flexible hose to a vacuum cleaner at one end and to a wand or a cleaning tool at the other end.

15 One common type of vacuum cleaner which is used for cleaning floors and other portions of a domestic establishment is provided with a canister or container in which the electric motor and dust bag are mounted, to which is connected the cleaning portion of the device, such as a rug cleaner, crevice cleaner, or other cleaning tools. These tools are interconnected to the vacuum cleaner by means of a flexible hose or conduit which is coupled to the vacuum cleaner at one end, and to a wand or a tool at the other end. In certain of these vacuum cleaners the rug cleaning unit contains a cleaning brush which is rotatably driven by an electric motor and the electric motor is mounted within the rug cleaning tool itself. This is intended to provide a rug cleaner which is similar in operation and results in a conventional upright vacuum cleaner.

35 In order to provide electric current to the motor mounted in the rug cleaning tool itself, it is necessary to bring the current-conducting wire from the canister to the motor in the tool. Heretofore, this has been effected by running a separate cord along the length of the flexible conduit and attaching it thereto. In such cases, the cord provides a restraining influence which prevents complete flexibility of the conduit and thus is inimical to the original purpose for which the conduit is intended. In addition, the cord tends to kink and bind and to create other problems. This

has been overcome by the development of a flexible conduit in which the reinforcing wires are themselves the current-carrying media, these wires being in the form of reinforcing springs which are helical members extending throughout the length of the flexible conduit. When such a conduit is used it is necessary to provide an interconnection from the conduit to the canister and power supply at one end, and to the cleaning tool or the wand at the other end. The present invention provides a connector which will permit such interconnection and which is readily releasable and attachable while at the same time avoiding unnecessary strain on the electrical connector and ensuring perfect safety from the standpoint of exposure to electric currents.

It is a primary object of this invention, therefore, to provide a vacuum cleaner hose assembly including a connector and electrical connection.

It is a further object of the invention to provide such assembly consisting of an inner and outer sleeve which jointly absorbs the strain on the electrical portion of the unit.

It is another object of the invention to provide a connector unit so designed that the vacuum and electrical components can be easily coupled.

It is another object of the invention to provide a connector comprising only three component members.

According to the present invention, in a vacuum cleaner hose assembly including a hose having a plurality of electrical conductors incorporated therein, there is provided a connector at one end of the hose for providing electrical and vacuum continuity, said connector consisting of an inner sleeve and an outer sleeve, and an electrical fitting interengaged between said inner and outer sleeves so that any strain on the connector is absorbed by both sleeves.

The invention is illustrated by way of example in the accompanying drawings, in which:

[Part of drawing not shown]

Figure 1 is a perspective view of the entire vacuum cleaning apparatus and hose assembly together with the connectors.

5 Figure 2 is an exploded perspective view of the components of a connector.

Figure 3 is a top view of the assembled connector and hose with parts broken away for purposes of clarity.

10 Figure 4 is a sectional view of the assembled unit shown in Figure 3.

Figure 5 is a sectional view of a portion of the assembly shown in Figure 3 with parts omitted for clarity.

15 Figure 6 is a sectional view taken along lines 6—6 of Figure 5.

Figure 7 is a sectional view taken along lines 7—7 of Figure 5.

20 Referring to the drawings, Figure 1 illustrates a vacuum cleaner and cleaning tool coupled by a hose assembly which is designated by the reference numeral 11, consisting primarily of a flexible conduit 12. The conduit 12 consists of a pair of helically coiled reinforcing wires 13 and 14 which form two independent supporting members, the turns of which alternate longitudinally of the hose; such reinforcing wires are surmounted by an outer tube 15 of flexible plastic material, such as vinyl or polyethylene. The wires are metal and serve as conductors of electric current and they are coated with a plastic material similar to that forming the outer tube. Attached to the ends of the conduit 12 are connectors 16 and 17, the construction of which will be more fully described hereinafter. The connector 16 is designed for interengagement with the canister 18 of the vacuum cleaner, which is provided with a vacuum outlet 19 and an electrical fitting 20 having outwardly extending or male prongs. The connector 16 can be attached to the canister so that the outlet 19 fits within an opening in the connector to provide continuity of the vacuum system. Electrical continuity is provided by means of a connector cord 21 having a female end 22 which plugs into the fitting 20 on the canister; and a male end 23 which plugs into a female electrical fitting 24 on the connector 16.

50 At the opposite end of the hose assembly the connector 17 is similar to connector 16 except that it includes a male electrical fitting 26. The connector 17 is designed to complete vacuum and electrical continuity with a wand or tool 27 and an electric wire 28, to which is attached a female fitting 29. The vacuum connection is provided by inserting the end of the wand 27 into the interior of the connector 17, a bead 30 on the wand providing a snap lock with a groove 25 in the connector. The fittings 29 and 26 are joined to provide the electrical connection.

65 It is apparent that the hose assembly and its connectors provide both electrical and vacuum continuity from the source of vacuum and elec-

tric power in the canister to the wand or cleaning tool. As previously stated, the tool 27 is part of a rug cleaning member having a power driven brush mounted therein, such brush being operated by electric current from a motor in the canister. The electrical circuit is completed from the motor to fitting 20, through the connector cord 21, through wires 13 and 14 of the conduit, through the fittings 26 and 29, and thence from the wire 28 to the cleaning tool motor (not shown). At the same time, vacuum is supplied from the canister 18 through the outlet 19, the opening in the hose assembly 11, and the wand 27.

70 Turning now to Figures 2 to 7, it will be seen that the connector 17 which will be described by way of example herein, consists of simply three members, viz., inner sleeve 31, outer sleeve 32, and electrical fitting 33. The inner sleeve 31 consists primarily of a hollow cylindrical member having on its surface a plurality of guide lugs 35 arranged in axial rows (preferably but not necessarily four rows spaced equally about the diameter of the sleeve). The lugs 35 are axially spaced with a helical pitch of approximately 1/2 inch, thus providing guiding means for the conduit 12 when it is attached to the outer surface of the sleeve as shown in Figures 3 and 4. The opposite end of the sleeve terminates in a collar 36 which extends outwardly of the outer surface of the sleeve. Axially spaced from the collar 36 is a boss 37 in which is formed a pair of locking rings 38 and 39; the boss 37 and the locking rings 38 and 39 thus provide locking members with the outer sleeve. The inner surface of the sleeve is formed with an internal locking groove 25 which provides a locking arrangement with the mating member, such as the bead 30 of the cleaning tool or a similar bead on the canister. One portion of the outer surface of the sleeve adjacent the collar 36 is formed in the shape of an outwardly angled boss 40 which extends from the edge of the collar 36 to the sleeve surface. The boss 40 includes a pair of upwardly extending lips 41 and 42 toward the upper end thereof and a second pair of lips 43 and 44 approximately adjacent the point where the boss merges with the outer surface. As will be more fully explained hereinafter, the lips provide locking surfaces for the electrical connector. Extending between the lips 41 and 42 is a lateral ridge 45, and a similar lateral ridge 46 is located between the lips 43 and 44. The ridges 45 and 46 define a recess 47 in the boss 40.

120 The outer sleeve 32 is also a hollow cylindrical plastic non-conducting member of the same material as the inner sleeve. Essentially it is simply a straight tubular member and has a pair of inner locking grooves 48 and 49 designed to interengage the mating rings 38 and 39 of the inner sleeve. At one portion of the outer surface of the sleeve an upwardly

angled hollow housing 50 extends almost to the end of the sleeve and has a generally mating configuration with the boss 40 of the inner sleeve. Extending across the interior of the housing is a groove 51 and adjacent this is a lateral ridge 52 having lips 53 and 54 extending inwardly toward the centre of the sleeve. The groove, the ridge, and the lips thus assist in holding the electrical fitting in place.

The electrical fitting 33 consists of a rectangular block 55 in which prongs 56 and 57 are embedded. These prongs are metal and form the electrical contacts with the mating portion of the electrical system. Extending around the block 55 is a larger rectangular block 58 and extending adjacent this block is a smaller block 59. Electrical wires 60 and 61 are fastened to the embedded ends of the prongs 56 and 57, and extend beyond the block 59. The free ends of the wires 60 and 61 are attached to the electrical wires of the conduit by means of clinching clips 62 and 63. It will be seen that the connector is designed to interengage with both inner and outer sleeves and this interengagement is effected by means of the steps described hereinafter.

First, the end of the conduit 12 is located within the outer sleeve 32 and rotated around the exterior of the inner sleeve 31 so that the wires 13 and 14 interengage to guide the lugs 35 to form a screw type connection between the inner sleeve and the hose. Then the free ends of the reinforcing wires of the conduit are withdrawn from the tube and attached to the wires 60 and 61 of the connector by means of clips 62 and 63. The connector is then placed into the boss 40 of the inner sleeve 31 in such a manner that the larger block 58 is lodged within the recess 47 and is wedged therein. The block 58 is further gripped tightly in that position by means of the lips 41, 42, 43 and 44; at the same time the lips 41 and 42 grip the sides of the block 55, and the lips 43 and 44 grip the sides of the block 59 to assist in the gripping arrangement. The prongs 56 and 57 thus have a lateral relationship. The internal sleeve, fitting, and hose are now pushed back into the outer sleeve to interengage the entire assembly, primarily by interlocking the locking rings 38 and 39 of the inner sleeve with the grooves 48 and 49 of the outer sleeve. At the same time the free portion of the fitting 33 is wedged within the interior of the housing 50 of the outer sleeve; the block 58 is wedged within the groove 51 and while the block 55 is gripped between the lips 53 and 54. A hard snap of the members thus causes the assembly to lock together.

Thus it will be seen that by means of the present invention a vacuum cleaner hose assembly has been devised in which the end connectors are employed for coupling both the vacuum and the electrical systems. In this assembly the outer and inner sleeves combine

to lock the electrical connector therebetween and remove the strain from such connector.

WHAT WE CLAIM IS:—

1. In a vacuum cleaner hose assembly including a hose having a plurality of electrical conductors incorporated therein, the improvement comprising a connector at one end of the hose for providing electrical and vacuum continuity, said connector consisting of an inner sleeve and an outer sleeve, and an electrical fitting interengaged between said inner and outer sleeves so that any strain on the connector is absorbed by both sleeves.

2. In a vacuum cleaner hose assembly including a hose having a plurality of electrical conductors incorporated therein, the improvement comprising a connector at one end of the hose for providing electrical and vacuum continuity, said connector consisting of an inner and an outer sleeve and an electrical fitting, said sleeves including means for jointly holding said fitting to absorb any strain thereon.

3. An assembly according to claim 2, wherein said means consists of structural members on said sleeves extending at an angle outwardly of their peripheries.

4. An assembly according to claim 3, wherein said members have mating configurations.

5. An assembly according to claim 4, wherein the structural member of said inner sleeve is a boss having a rectangular outer surface, and the structural member of said outer sleeve is a hollow member enveloping said boss and having an inner surface parallel to the outer surface of said boss.

6. An assembly according to claim 2, wherein said inner sleeve has a boss extending angularly outward from its periphery and a plurality of lips on its outer surface for gripping said fitting.

7. An assembly according to claim 6, having at least two pairs of parallel and opposite lips, a transverse ridge between each pair of lips said ridges defining a groove therebetween and said lips, ridges and groove all cooperate to grip a portion of said fitting.

8. An assembly according to claim 2, wherein said outer sleeve has a hollow member extending angularly outward formed with a pair of lips and a transverse groove on its inner surface.

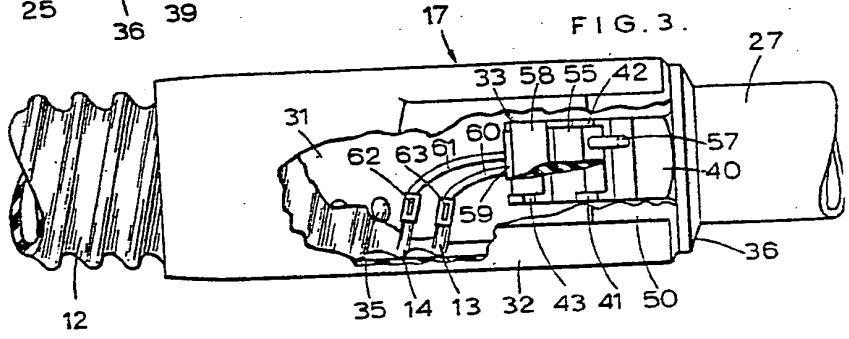
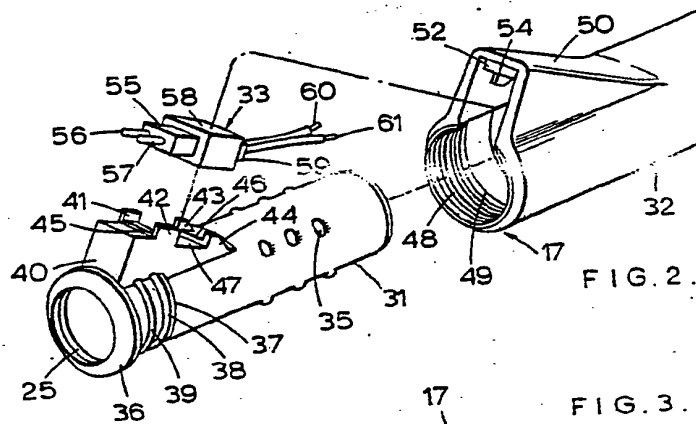
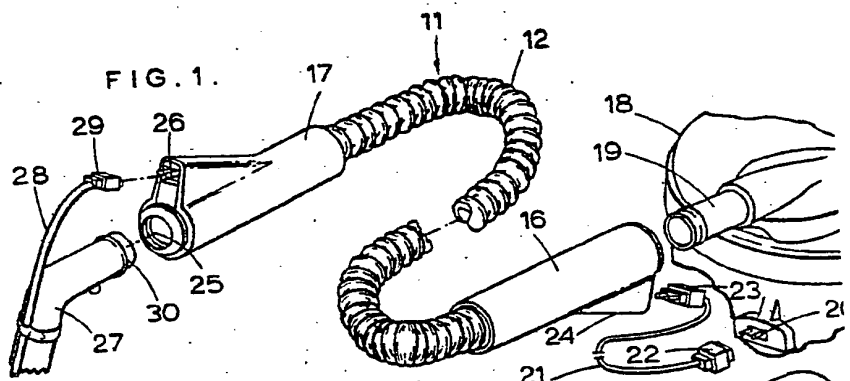
9. In a vacuum cleaner hose assembly including a hose having a plurality of electrical conductors incorporated therein, the improvement comprising a connector at one end of the hose for providing electrical and vacuum continuity, said connector consisting of an inner sleeve and an outer sleeve and an electrical fitting; said inner sleeve having an outwardly angled boss having at least two pairs of lips on its surface with transverse ridges therebetween, said ridges defining a groove, said outer sleeve having a similarly outwardly angled hollow member having an inwardly ex-

5 tending pair of lips and a transverse groove at the inner surface thereof, said member enveloping and generally mating with said boss, the grooves of said inner and outer sleeves being opposite each other and the lips of said outer member being opposite a pair of lips of said inner member, said lips and grooves cooperating to grip said fitting and relieve any strain thereon.

10. A vacuum cleaner hose assembly substantially as hereinbefore described with reference to the accompanying drawings.

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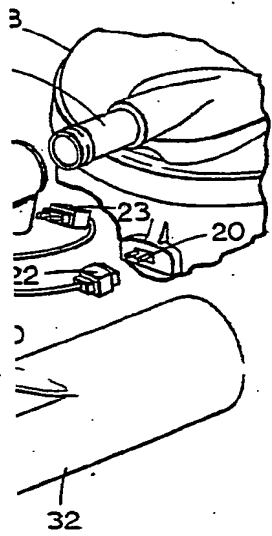


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COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of
the Original on a reduced scale
Sheets 1 & 2



G. 2.

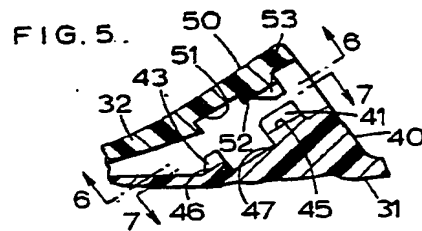
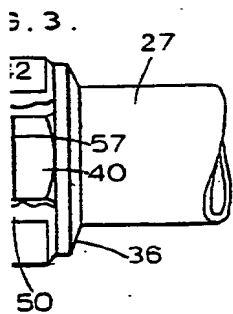


FIG. 6.

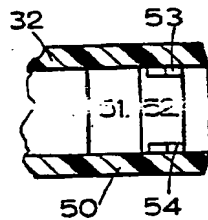


FIG. 7.

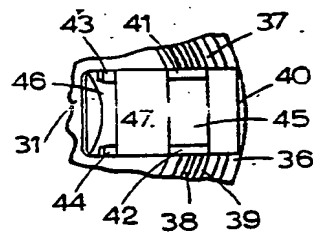


FIG. 4.

